

HARATA et al
Appl. No. 10/617,700
August 1, 2005

AMENDMENTS TO THE CLAIMS:

1. (Currently Amended) A fluid injection nozzle comprising:

a valve body providing a valve seat on an inner surface, said inner surface defining a fluid passage whose cross-sectional area decreases toward a downstream side;

a valve member for cooperating with said valve seat to open and close said fluid passage; and

a plate disposed on a downstream side of said fluid passage, said plate defining a first plurality of through holes for injecting fluid, said plate providing a chamber just above said through holes,

wherein said chamber is defined by an approximately flat surface of said plate and extends substantially parallel with said plate, and wherein a diameter of said chamber is larger than a downstream end opening of said inner surface of said valve body, and wherein said through holes have inlet openings at an area radially outside a projected area of said downstream end opening in an axial direction,

wherein said chamber extends radially outwardly beyond said through holes by more than a diameter of said through holes,

wherein an imaginary line along said inner surface of said valve body directly crosses said plate at a crossing point, and

wherein said through holes are radially disposed having a displacement with respect to the crossing point.

2. (Currently Amended) A fluid injection nozzle comprising:

a valve body providing a valve seat on an inner surface, said inner surface defining a fluid passage whose cross-sectional area is decreased toward a downstream side;

a valve member for cooperating with said valve seat to open and close said fluid passage; and

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a plate disposed on a downstream side of said fluid passage, said plate having a first plurality of through holes for injecting fluid,

wherein said plate is located at a far end of a downstream direction of the fluid injection nozzle,

wherein said plate defines a chamber just above said through holes, wherein said chamber is defined by a flat surface of said plate and extends substantially parallel to said plate, and wherein a diameter of said chamber is larger than a downstream end opening of said inner surface of said valve body, and wherein said through holes have ~~hole has an inlet openings~~ at an area outside a projected area of said downstream end opening in an axial direction, and

wherein said valve body defines a depression at its downstream end for defining said chamber, and said inlet of said through holes face ~~hole faces a~~ bottom surface of said depression.

3. (Currently Amended) A fluid injection nozzle comprising:

a valve body providing a valve seat on an inner surface, said inner surface defining a fluid passage whose cross-sectional area is decreased in a downstream direction;

a valve member for cooperating with said valve seat to open and close said fluid passage; and

a plate disposed on a downstream side of said fluid passage, said plate defining a first plurality of through holes for injecting fluid,

said plate defining a chamber just above said through holes, wherein said chamber is defined by an approximately flat surface of said plate and extends substantially parallel with said plate, and wherein a diameter of said chamber is larger than a downstream end opening of said inner surface of said valve body, and wherein said through ~~hole has an inlet~~ holes have inlets opened at an area outside a projected area of said downstream end opening in an axial direction, and

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wherein said valve body has a depression at its downstream end for defining said chamber, and said ~~inlet-inlets~~ of said through ~~hole-faces~~ holes face a bottom surface of said depression, wherein the bottom surface of said depression extends substantially parallel with said plate.

4. (Original) A fluid injection nozzle according to claim 1, wherein said plate is fixed to the valve body.

5. (Original) A fluid injection nozzle according to claim 2, wherein said plate is fixed to the valve body.

6. (Original) A fluid Injection nozzle according to claim 3, wherein said plate is fixed to the valve body.

7. (Currently Amended) A fluid injection nozzle according to claim 1, wherein said through ~~hole~~ has holes have a round cross-sectional shape.

8. (Currently Amended) A fluid injection nozzle according to claim 2, wherein said through ~~hole~~ has holes have a round cross-sectional shape.

9. (Currently Amended) A fluid injection nozzle according to claim 3, wherein said through ~~hole~~ has holes have a round cross-sectional shape.

10. (Previously presented) A fluid injection nozzle according to claim 1, wherein the inlet openings of the through holes are located radially outside of the crossing point.

11. (Previously presented) A fluid injection nozzle according to claim 1, wherein the imaginary line along the inner surface of the valve body crosses an imaginary line

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substantially axially aligned with one of the through holes at a point upstream from the downstream end opening.

12. (Previously presented) A fluid injection nozzle according to claim 1, wherein said imaginary line along said inner surface of the valve body does not intersect any other imaginary along said inner surface of the valve body.

13. (Currently Amended) A fluid injection nozzle comprising:

a valve body providing a valve seat on an inner surface, said inner surface defining a fluid passage whose cross-sectional area is decreased towards a downstream side;

a valve member for cooperating with said valve seat to open and close said fluid passage; and

a plate disposed on a downstream side of said fluid passage, said plate having a first plurality of through holes for injecting fluid,

wherein said plate is located at a far end of a downstream direction of the fluid injection nozzle,

wherein said plate defines a chamber just above said through holes, said chamber is defined by a flat surface of said plate, a diameter of said chamber is larger than a downstream end opening of said inner surface of said valve body, and said through holes are respectively inclined to a longitudinal axis of the valve member hole ~~has an inlet opening, at least a portion of which is located at an area radially outside a projected area of said downstream end opening in an axial direction, and~~

wherein said valve body defines a depression at its downstream end for defining said chamber, ~~and at least said portion of said inlet opening of said through hole faces a bottom surface of said depression.~~

14. (Previously presented) The fluid injection nozzle according to claim 13, wherein said chamber extends substantially parallel to said plate.

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15. (Currently Amended) A fluid injection nozzle comprising:

a valve body providing a valve seat on an inner surface, said inner surface defining a fluid passage whose cross-sectional area is decreased in a downstream direction;

a valve member for cooperating with said valve seat to open and close said fluid passage; and

a plate disposed on a downstream side of said fluid passage, said plate defining a first plurality of through holes for injecting fluid,

said plate defining a chamber just above said through holes, said chamber is defined by an approximately flat surface of said plate, and a diameter of said chamber is larger than a downstream end opening of said inner surface of said valve body, and ~~said through hole has an inlet opening, at least a portion of which is located at an area radially outside a projected area of said downstream end opening in an axial direction,~~ and

wherein said valve body defines a depression at its downstream end for defining said chamber, and ~~said inlet of said through hole faces a bottom surface of said depression,~~ wherein the bottom surface of said depression extends substantially parallel with said plate.

16. (Previously presented) The fluid injection nozzle according to claim 15, wherein said chamber extends substantially parallel to said plate.